



# INSIDER

Newsletter for the Employees of Ames Laboratory ■ Volume 16, Number 5 ■ May 2005

## TASF Hallway Comes Alive

New wall art focuses on the human side of science

**W**e've always heard that science is fun, and now we know it's true, at least for the 14 researchers whose vibrant new photos are livening up first-floor TASF.

The refreshing "hallway art" was a project of Graphics intern Shauna Stephenson during spring semester, before her graduation from Iowa State with a degree in journalism and mass communication. Stephenson wanted the researchers' photos to reflect some facet of their personalities – to offer some insight to the human being behind the science. Judging from the praise the new hallway art received at an impromptu May gathering to introduce it to Lab employees, she succeeded in grand style.

If you haven't had a chance to visit the new "photo gallery" in TASF, make it a point to stop. It's a "science-friendly" exhibit! ■



**Talk about a "nose job!" Senior metallurgist Iver Anderson and Graphics intern Shauna Stephenson stand by Anderson's playful photo. (You just know that had to be a fun photo shoot!)**

**Visitors to the TASF hallway art exhibit admire the picture of the always photogenic Surya Mallapragada, director of Materials Chemistry and Biomolecular Materials.**



**Employees enjoy cookies and punch while they study the new TASF hallway art.**

# Secretary of Energy Sam Bodman is coming to Ames Laboratory Friday, June 3, 2005



## Electrical Review Team Makes Recommendations

*NFPA 70E training a major emphasis*

Upgrades in training and procedural changes were the primary recommendations handed down by a review team that looked at work on energized electrical equipment at Ames Laboratory, April 11-15. The review is part of an assessment of electrical procedures at nine Office of Science laboratories that was requested by SC Director Raymond Orbach in response to a serious electrical incident at the Stanford Linear Accelerator Center that resulted in an electrician being seriously injured.

The four-member review team looked at safety documents, procurement documents and training programs; interviewed Ames Lab and Iowa State University staff; and toured the facilities. According to Ames Lab industrial safety specialist Shawn Nelson, the review included ISU staff because ISU electricians perform the high voltage work (above 600 volts) and because Ames Laboratory facilities connect to the ISU electrical distribution system.

Even without high-voltage requirements, Lab electricians

routinely de-energize the power before working on anything. "The Laboratory has adopted the policy that no live electrical work will be performed with the exception of testing and troubleshooting," Nelson says, "and even then, safe work practices will be followed. In most cases, there's just simply no reason to work on equipment that's energized."

While that policy drew praise from the review team, reviewers found the Lab's electrical safety manual to be somewhat cumbersome and voluminous and recommended it be simplified and updated to make it current with NFPA 70E Standards.

Another shortcoming cited was the lack of systematic preventative maintenance on the electrical switchgear. "Facilities Services will be developing a preventative maintenance program," Nelson says.



**Members of the review team check out the breaker panels in the Shops Building.**

Many of the review teams recommendations relate to implementation of the National Fire Protection Association's 70E Standard for Electrical Safety Requirements for Employee Workplaces. Key supervisors will receive formal training in the NFPA 70E program as will electricians and technicians. In addition the electrical safety training for all Lab staff will

be revamped to reflect the 70E standards.

"With the additional training, we will be able to implement these standards across the Lab," Nelson says, "and incorporate them into our overall electrical safety program." ■

*~ Kerry Gibson*





## Several from Lab Receive LAS Honors

**F**our Ames Laboratory researchers have been honored for their accomplishments by Iowa State University's College of Liberal Arts and Sciences. They will be formally recognized in the fall during the LAS Faculty/Staff Convocation on Wednesday, Sept. 7.

The awards and recipients include:

**Excellence in Research/Artistic Creativity** – *recognizes faculty members who have a national or international reputation for contributions in research and/or artistic creativity, and who have influenced the activities of students.*

**Mark Gordon**, a well-known Yankee fan and New Yorker extraordinaire, is also the Ames Laboratory program director of Applied Mathematics and Computational Sciences and an ISU distinguished professor of chemistry in the College of Liberal Arts and Sciences. Gordon is known internationally for his development of a group of computer programs known as GAMESS (General Atomic and Molecular Electronic Structure System). He also developed a computational technique, which makes possible the detailed calculation of very complicated systems, such as solute molecules surrounded by a large number of solvent molecules, or simulations of polymers. ■



**Graduate Teaching** – *recognizes the efforts of major professors who not only serve as effective mentors and who enrich the student-professor relationship by support and attention to detail, but also excel in graduate classroom instruction.*

**George Kraus**, assistant director of Bio-related Initiatives and an ISU university professor of chemistry, receives praise from graduate students for his extensive knowledge of spectroscopy, his ability to communicate difficult concepts clearly and his enthusiasm for teaching. Since 1976, he has mentored 44 Ph.D. students and 15 M.S. students who have gone on to have highly successful careers as researchers and faculty members. ■



## Murphy wins Callaway tourney

**M**ark Murphy, division director of Technical and Administrative Services, used some pin-point accuracy on his approach shots to capture the title of the inaugural May Callaway Golf Tournament, held May 13 at the Boone Golf and Country Club. Murphy shot an 18-hole score of 74 in the handicapped tournament and captured "Closest to the Pin" honors on all three of the designated holes.

Dan Kayser, Tom Lograsso, Tom Wessels, Drew Fullerton and Stan Bajic finished in the first tier, and Dave Boeke, Diane Muncrief, Trevor Riedemann, Barbara Lograsso and Carol Mack in the second tier. Longest drive honors on hole number one went to Bajic. Tom Lograsso and Fullerton had the longest putts on holes eight and nine, respectively.

### Mid-Career Award in Excellence in Research/Artistic Creativity

– *recognizes faculty members who have a national or international reputation for contributions in research and/or artistic creativity, and who have influenced the research activities of students.*

**Paul Canfield**, senior physicist and an ISU professor of physics and astronomy, has established a world-renowned crystal growth and characterization research laboratory, specializing in the design, discovery, growth and characterization of novel materials.



**Jim Evans**, senior scientist and an ISU professor of mathematics, is widely recognized for his outstanding contributions to statistical mechanics and for his strength in connecting theory and experiment in his work. His contributions to the areas of thin film growth and catalytic surface reactions are considered seminal in the field. ■

## Remembering Marvin Thompson

**W**ord has been received of the death of Marvin E. Thompson, Friday, May 13, 2005, at Israel Family Hospice House in Ames. Thompson was an Ames Lab senior research technician working in what was then the Metallurgy and Ceramics Program when he retired in May 1991 after a 34-year career. Following his retirement from the Lab, he worked at Ryerson Implement in Story City.



Remembering Thompson with fondness, Larry Jones, director of the Materials Preparation Center, says, "Marv was an excellent technician – very precise and meticulous, and this character trait extended to his tool tote. Everything was always in its place. You didn't get into Marv's toolbox without checking with him first or there would be hell to pay for it," says Jones, recalling that he had received a reprimand or two for doing just that, as had many others in the MPC.

Thompson's respect for and expertise with the tools of his trade extended outside of the Lab, as well. "Marv was fascinated with tractors and was quite a collector of John Deeres, which he loved to rebuild," says Jones.

Lanny Lincoln, senior research technician, says, "Marv took me under his wing when I came to the Lab. He taught me about the vacuum systems and how they operated, something I didn't have a clue about at the time." Lincoln adds that Thompson also taught him how to arrange his toolbox and keep it in order. "I followed his advice," says Lincoln. "Marv was a unique person and excellent in his technical abilities."

Memorials for Marvin Thompson may be made to the Israel Family Hospice House. ■

## Where Did the Time Go?

*Employees honored for years of service to Ames Lab*

Could it really be five years since the last time I attended one of these functions?"

"Didn't we sit together at the same table before? It just doesn't seem like it could have been five years ago."

Such were the comments overheard as employees gathered in the Campanile Room of the Memorial Union for the Ames Lab Service Awards luncheon in May. The annual event recognizes employees for their service to the Lab in five-year intervals, beginning with their 10th year of employment.

From these employee comments, you can only imagine how quickly the time must seem to pass for Director Tom Barton, who presides over each yearly awards luncheon, thanking and congratulating employees for their commitment to and support of the Laboratory. As he is fond of telling a joke or two on these light-hearted occasions, Barton has often noted that one of his fears is repeating a story the same group of honorees heard five years previously. It is a predicament, but one he resolved, for this year anyway, with an audience-participation activity.

Borrowing from his Science Bowl experiences, Barton developed (with the help of Google) a "Science Bowl for Seniors" competition. Both honorees and their guests participated, answering questions with debatable science content. For example:

1. How long did the Hundred Years War Last?
2. If you went to bed at 8 o'clock at night and wound up your clock alarm to get you up at 9 o'clock the next morning, how many hours sleep would you get?
3. In baseball, how many outs in an inning?

Players were given only three seconds to respond to each question, so reflex answers were not always the correct ones. Nonetheless, four players stood out, taking home prizes gathered just the hour before from Barton's desk drawer: Ila Haugen, a U.S. two-dollar bill; Sharon Hjortshoj (John's wife) a Polish 500-zloty bill; Dave Rehbein a Russian 100-ruble bill; and Ellen Price, a Costa Rican 100-colonas coin. Oh, you want the answers to the questions? Well, all right. Barton can probably Google some new ones for next year's Service Awards Luncheon! You'll find the answers at the bottom of the page. ■

~ Saren Johnston

**35 Years** *David Eckels and John McClelland were unavailable for pictures.*



**30 Years** (clockwise from upper left) *Dave Rehbein, Jim Anderegg, Sam Houk, and Pat Emley. Not pictured: John Hayes, Sam Washington, and Jerel Zarestky.*



**25 Years** (clockwise from upper left) *Ila Haugen, John Hjortshoj, Mike Dotzler, Rose Bielefeldt, and Ellen Price. Not pictured: Robert Angelici.*



**20 Years** (left to right) *Matt Kramer, Gary Walter and Costas Soukoulis. Not pictured: David Jiles.*

## Quiz Answers

1. 116 years, from 1337 to 1453.
2. One hour (wind-up clocks don't have a.m. and p.m. settings).
3. Six.





**15 Years** (left to right) Hal Sailsbury, Deb Covey, Vicki Johnson, and Frank Tourtellott. Not pictured: Fran Dunshee.



**10 Years** Alexandra "Sasha" Tsokol and Richard Malmquist. Not pictured: Catherine Long.

## Flights of Fancy

*Physics of butterfly flight featured at Reiman Gardens*

At first glance, it looked as if some unusually large and exotic butterflies had escaped from the carefully tended butterfly wing at Reiman Gardens. The long exhibit hall that runs by the climate-controlled butterfly haven was all "a-flutter" with giant blue, yellow, pink, orange and red flapping wings.

But these colorful creatures were not "hitchhikers" that had left their safe home on the sleeve of a shirt or in the pocket of an open purse. Rather, they were the delightful art of youngsters who had stopped at the Ames Laboratory discovery station to learn more about the physics of butterfly flight and make their own butterflies to take home.

The Reiman Gardens event was another in a yearlong series of activities coordinated by Ames Lab's Public Affairs Office to help celebrate the 2005 World Year of Physics. Staffing the May 14 event were Donald Lewis, an Iowa State University professor of entomology, and John Jacobson, an ISU assistant professor of aerospace

engineering.

The researchers visited with youngsters and adults about the butterfly's anatomy, explaining that the thorax contains strong muscles that make the wings move up and down in a figure-eight pattern during flight. Noting that the fluttering of butterflies is the result of a wide array of aerodynamic mechanisms, they told visitors about an Oxford University study that identified six different ways butterflies flap and rotate their wings to stay airborne. The study showed that on some occasions butterflies deliberately create vortices to achieve extra lift. Insect wings produce 10 times the amount of lift achieved by aircraft wings (per unit of area).

After learning more about butterfly flight, Reiman visitors participated in a butterfly-making activity led by Saren Johnston, Public Affairs; Jan Weedman, Graphics; and Donna Millang, IPRT Business Office. ■

~ Saren Johnston



Donald Lewis (foreground) and John Jacobson discuss butterfly flight with some "older kids."



Two youngsters proudly show off their butterfly creations.

## Fighting Brain Tumors with HIFU

Ultrasound, that mainstay of medical imaging, may one day be used to wipe out brain tumors, thanks to a \$350,000 research grant from the Roy J. Carver Charitable Trust. The grant was recently awarded to a team led by Viren Amin, a scientist at IPRT's Center for Nondestructive Evaluation and an ISU adjunct professor of electrical and computer engineering.

The team will demonstrate the feasibility of using high-intensity focused ultrasound, or HIFU, as a noninvasive way to treat brain tumors. HIFU relies on ultrasound waves at an intensity several orders of magnitude higher than those used in medical imaging. With HIFU, Amin explains, the waves are focused much in the same way a magnifying glass focuses sunlight to burn a dry leaf or piece of paper.

In medical applications, HIFU can precisely destroy cells by generating heat, but it can do so without destroying cells outside of the focused area. "You want to cook only the tumor and not the surrounding cells," Amin explains. Indeed, other researchers are studying HIFU to treat breast, prostate and other cancers as well as to stop internal bleeding.

There are many challenges to overcome, however, before HIFU can be used to destroy brain tumors. "How do you predict what the ultrasound beam will do when it goes through so many layers of tissue?" asks Amin. This tissue inhomogeneity causes ultrasound energy to be localized in hot spots. CNDE scientist Ron Roberts, along with CNDE director Bruce Thompson, have developed computational models for ultrasound propagation through inhomogeneous materials. Amin says this knowledge can be applied to medical applications to develop high-precision HIFU therapy.

Another challenge is in calculating and delivering the HIFU therapy dose (frequency, intensity and focus) for a specific tumor type and location. So, the researchers will develop imaging and visualization tools to inte-

grate MRI and ultrasound images as well as simulations of ultrasound beams through tissues and of the heat generated at the focus. These tools will be used to help plan HIFU therapy and guide the actual use of HIFU.

"It's a true multidisciplinary project," says Amin, who has degrees in both medicine and biomedical engineering. Other team members include Roberts and Thompson of CNDE; Mark Bryden, an associate in IPRT's Virtual Reality Applications Center and an ISU professor of mechanical engineering; and Scott McClure, an ISU professor of veterinary medicine. Other collaborators include Timothy Ryken, a doctor in the department of neurosurgery and radiation oncology at the University of Iowa, and Shahram Vaezy of the University of Washington, an expert in HIFU.

After work on the grant is done, "we'll be able to take this project further in multiple ways," says Amin, citing areas such as understanding HIFU-tissue interactions, HIFU beam design with phased-array ultrasound transducers, image-guided planning and therapy, and others.

### Thompson Addresses Graduates

"So you will face challenges and changes in your life, and if you are pushing the envelope, as I hope you will, you will occasionally be knocked down. How will you handle these situations? I submit that a key ingredient is to select activities, in profession, recreation and service, in which you have passion. It is the intense, driving or overmastering feelings that you should have for these activities that will be a tremendous ally on the journey."

— R. Bruce Thompson, in his address at the Iowa State University Graduate College commencement, May 6, 2005. Thompson is director of IPRT's Center for Nondestructive Evaluation and a distinguished professor of engineering at ISU.



## Brazilian Scientist Studies Biodiesel

Carla Kern only became interested in biodiesel in 2004, but she's fast becoming an expert in the field. A professor of chemistry from Centro Universitario Univates in Lajeado, RS, Brazil, Kern is a visiting scientist with IPRT's Center for Catalysis. She is studying with Victor Lin, a CCAT scientist and a professor of chemistry at Iowa State University.

AT ISU, Kern is experimenting with heterogeneous catalysts used to turn vegetable oil into biodiesel. "Heterogeneous catalysts are solid and thus can be easily filtered out after the reaction without the use of harmful chemicals," Kern says. The catalysts can also be re-used, making them more economical.

Kern first learned about ISU in 2003, when she heard a talk by Richard Larock, a university professor of chemistry at ISU. A later lecture on biodiesel sparked her interest in the topic. Kern says she believes she is the only Brazilian scientist studying biodiesel outside the country. George Kraus, CCAT director, says of Kern, "We're excited she chose to do research with us. We welcome international collaborators."

Part of Kern's interest in biodiesel stems from the fact she's from southern Brazil, a leading soybean region. Brazil is second only to the U.S. in soybean production, and, Kern points out, has the potential to vastly increase its production. In Brazil, however, the source of vegetable oil for making biodiesel goes beyond soybeans and includes radishes, castor oil,



*Carla Kern takes a sample during a reaction of soy oil, methanol and a heterogeneous catalyst made from magnesium oxide. Kern, a visiting scientist from Brazil, is studying biodiesel at CCAT.*

palm oil, peanuts and sunflowers as well as nuts from an Amazon tree called a babassu. "Many of these sources of vegetable oil actually produce much more oil per hectare of land than do soybeans," Kern notes.

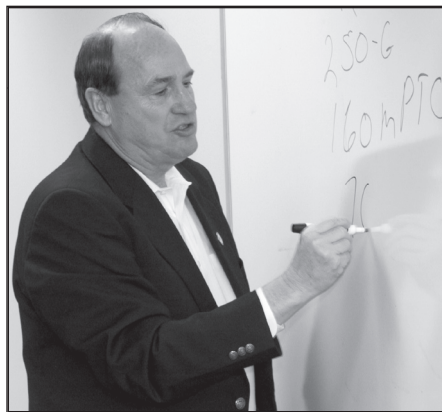
Kern believes Brazil has many incentives for growing its use of biodiesel. "We have a social vision of helping the many poor people of Brazil," she says. Providing a larger market for a variety of crops is one way of boosting the agricultural economy. Moreover, Brazil has a goal of becoming energy independent and of improving the environment.

On a more personal note, Kern says she "loves working at ISU. The people are helpful, friendly and supportive," adding that she appreciates the laboratory's equipment. Kern is also enjoying her time in the U.S. "Ames is a very pleasant and safe town, with friendly people," she says. "I enjoy walking in the parks."

## IPRT Meets with Iowa Legislators



*State Representative Mark Smith (left) talks with IPRT's Paul Berge and Copperfield Chimney's Karen Stickels during IPRT's legislative breakfast, held in March at the Iowa State Capitol.*



*State Senator Stewart Iverson explains the state budget during the Ames Chamber of Commerce Legislative Luncheon, held in April. IPRT hosted the meeting in TASF.*

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## Don't Miss This One!

Ames Laboratory, in cooperation with the ISU Department of Physics and Astronomy, presents a 2005 World Year of Physics event:

### The Physics of Baseball

So you think you understand baseball. Oh yeah – what about the physics behind America's favorite pastime? Gotcha there! But it's never too late to "step up to the plate." Here's your chance.

Date: Thursday, June 23

Time: Noon

Place: 301B Spedding Hall (auditorium) — Bring your sack lunch!

Host: Eli Rosenberg, chair, Department of Physics and Astronomy

Attend this WYOP event and learn more about what's really going on at the "old ball game" before the July 15 Ames Lab/IPRT Iowa Cubs group outing.



## Go to an I-Cubs Game

You can still sign up for the Ames Lab/IPRT group outing to an Iowa Cubs game on Friday, July 15. The Cubs are playing Omaha. Game time is 7:05 p.m. Transportation is on your own. Tickets are \$5.50. Contact Saren Johnston at 4-3474 or [sarenj@ameslab.gov](mailto:sarenj@ameslab.gov) to reserve your tickets.



## Correction

The April issue of *Insider* incorrectly reported the date for the switch from summer hours back to regular hours. Summer hours run through Friday, Aug. 12. Regular hours resume on Monday, Aug. 15.

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